IN THE CLAIMS:

1. (Currently Amended) A system for controlling motion of an object, the system comprising:

a motion device which is operable to move the object;

a motion control system which is coupled to the motion device, wherein the motion control system includes a processor and a memory medium, wherein the memory medium stores a motion control software program, wherein the motion control software program is executable by the processor to:

determine a placement of pulses for each of a plurality of time intervals, wherein the pulses ~~are placed evenly~~ have an average desired pulse rate across the plurality of time intervals, wherein the quantity of pulses in each of the time intervals is variable, wherein in determining the placement of pulses for each of the plurality of time intervals, the motion control software program is executable by the processor to:

determine a placement of pulses for a first time interval at a first rate of pulse generation per time interval, the first rate having a value of 1 plus an integer portion of a desired fractional rate of pulse generation per time interval; and

determine a placement of pulses for a second time interval following the first time interval at a second rate having a value of the integer portion of the desired fractional rate of pulse generation; and

generate the pulses across the time intervals according to the determined placement to drive the motion device to move the object.

2. (Cancelled)

3. (Original) The system of claim 1,

wherein in determining the placement of pulses for each of the plurality of time intervals, the motion control software program is executable by the processor to:

use a delay to place each pulse at an arbitrary location within one of the time intervals.

4. (Original) The system of claim 1,

wherein the time intervals are variable in length.

5. (Original) The system of claim 1,

wherein the time intervals are fixed in length.

6. (Original) The system of claim 5,

wherein in determining the placement of pulses for each of the plurality of time intervals, the motion control software program is executable by the processor to:

change a pulse rate within one of the time intervals.

7. (Original) The system of claim 1,

wherein the motion device comprises a stepper motor.

8. (Original) The system of claim 1, further comprising:

a power drive which is coupled to the motion device and the motion control system, wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

9. (Original) The system of claim 1,

wherein the motion control system comprises:

a computer system; and

a motion controller.

10. (Currently Amended) A method for controlling motion of an object, the method comprising:

determining a placement of pulses for each of a plurality of time intervals, wherein the pulses ~~are placed evenly~~ have an average desired pulse rate across the plurality of time intervals, wherein the quantity of pulses in each of the time intervals is variable, wherein the

determining the placement of pulses for each of the plurality of time intervals further comprises:

determining a placement of pulses for a first time interval at a first rate of pulse generation per time interval, the first rate having a value of 1 plus an integer portion of a desired fractional rate of pulse generation per time interval; and

determining a placement of pulses for a second time interval following the first time interval at a second rate having a value of the integer portion of the desired fractional rate of pulse generation; and

generating the pulses across the time intervals according to the determined placement to drive a motion device to move an object.

11. (Cancelled)

12. (Original) The method of claim 10,

wherein the determining the placement of pulses for each of the plurality of time intervals further comprises:

using a delay to place each pulse at an arbitrary location within one of the time intervals.

13. (Original) The method of claim 10,

wherein the time intervals are variable in length.

14. (Original) The method of claim 10,

wherein the time intervals are fixed in length.

15. (Original) The method of claim 14,

wherein the determining the placement of pulses for each of the plurality of time intervals further comprises:

changing a pulse rate within one of the time intervals.

16. (Original) The method of claim 10,

wherein the motion device comprises a stepper motor.

17. (Original) The method of claim 10,

wherein the motion device is coupled to a motion control system, wherein the motion control system includes a processor and a memory medium, and wherein the memory medium stores a motion control software program.

18. (Original) The method of claim 17,

wherein the motion control system comprises:

a computer system; and

a motion controller.

19. (Original) The method of claim 17,

wherein a power drive is coupled to the motion device and the motion control system, and wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

20. (Currently Amended) A carrier medium comprising program instructions for controlling motion of an object, wherein the program instructions are executable by a motion control system to implement:

determining a placement of pulses for each of a plurality of time intervals, wherein the pulses ~~are placed evenly~~ have an average desired pulse rate across the plurality of time intervals, wherein the quantity of pulses in each of the time intervals is variable, wherein the determining the placement of pulses for each of the plurality of time intervals further comprises:

determining a placement of pulses for a first time interval at a first rate of pulse generation per time interval, the first rate having a value of 1 plus an integer portion of a desired fractional rate of pulse generation per time interval; and

determining a placement of pulses for a second time interval following the

<u>first time interval at a second rate having a value of the integer portion of the desired fractional rate of pulse generation</u>; and

generating the pulses across the time intervals according to the determined placement to drive a motion device to move an object.

21. (Cancelled)

22. (Original) The carrier medium of claim 20,

wherein the determining the placement of pulses for each of the plurality of time intervals further comprises:

using a delay to place each pulse at an arbitrary location within one of the time intervals.

23. (Original) The carrier medium of claim 20,

wherein the time intervals are variable in length.

24. (Original) The carrier medium of claim 20,

wherein the time intervals are fixed in length.

25. (Original) The carrier medium of claim 24,

wherein the determining the placement of pulses for each of the plurality of time intervals further comprises:

changing a pulse rate within one of the time intervals.

26. (Original) The carrier medium of claim 20,

wherein the motion device comprises a stepper motor.

27. (Original) The carrier medium of claim 20,

wherein the motion control system comprises:

a computer system; and

a motion controller.

28. (Original) The carrier medium of claim 27,

wherein a power drive is coupled to the motion device and the motion control system, and wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

29. (New) A system for controlling motion of an object, the system comprising:

a motion device which is operable to move the object;

a motion control system which is coupled to the motion device, wherein the motion control system includes a processor and a memory medium, wherein the memory medium stores a motion control software program, wherein the motion control software program is executable by the processor to:

determine a placement of one or more pulses for each of at least a subset of a plurality of time intervals, wherein two or more of the at least a subset of the plurality of time intervals have differing quantities of pulses, wherein each time interval that includes one or more pulses includes a first pulse and a last pulse, and wherein a deadband between the start of the last pulse in the time interval and the end of the time interval is no larger than a largest pulse period in the time interval; and

generate the pulses across the time intervals according to the determined placement to drive the motion device to move the object in a substantially smooth manner.

30. (New) The system of claim 29,

wherein in determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals, the motion control software program is executable by the processor to:

determine a placement of pulses for a first time interval according to a first pulse period, the first pulse period having an integer value corresponding to a desired fractional pulse period for the first time interval; and

determine a placement of pulses for a second time interval following the first

time interval according to a second pulse period, the second pulse period having an integer value corresponding to a desired fractional pulse period for the second time interval.

31. (New) The system of claim 30,

wherein each of the plurality of time intervals has a corresponding desired fractional pulse period based on:

a desired behavior of the motion control device over the plurality of time intervals; and

an actual behavior of the motion control device at the beginning of the time interval.

32. (New) The system of claim 29,

wherein in determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals, the motion control software program is executable by the processor to:

use a delay to place each pulse at an arbitrary location within one of the time intervals.

33. (New) The system of claim 29,

wherein the time intervals are variable in length.

34. (New) The system of claim 29,

wherein the time intervals are fixed in length.

35. (New) The system of claim 34,

wherein in determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals, the motion control software program is executable by the processor to:

change a pulse period within one of the time intervals.

36. (New) The system of claim 29, wherein at least one of the time intervals has a

single pulse, wherein the first pulse of the time interval is the last pulse of the time interval.

37. (New) The system of claim 29, wherein at least one of the plurality of time intervals has zero pulses.

38. (New) The system of claim 29, wherein the pulses have an desired average pulse period across the plurality of time intervals.

39. (New) The system of claim 29,

wherein the motion device comprises a stepper motor.

40. (New) The system of claim 29, further comprising:

a power drive which is coupled to the motion device and the motion control system, wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

41. (New) The system of claim 29,

wherein the motion control system comprises:

a computer system; and

a motion controller.

42. (New) A method for controlling motion of an object, the method comprising:

determining a placement of one or more pulses for each of at least a subset of a plurality of time intervals, wherein two or more of the at least a subset of the plurality of time intervals have differing quantities of pulses, wherein each time interval that includes one or more pulses includes a first pulse and a last pulse, and wherein a deadband between the start of the last pulse in the time interval and the end of the time interval is no larger than a largest pulse period in the time interval; and

generating the pulses across the time intervals according to the determined placement to drive a motion device to move an object in a substantially smooth manner.

43. (New) The method of claim 42, wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

determining a placement of pulses for a first time interval according to a first pulse period, the first pulse period having an integer value corresponding to a desired fractional pulse period for the first time interval; and

determining a placement of pulses for a second time interval following the first time interval according to a second pulse period, the second pulse period having an integer value corresponding to a desired fractional pulse period for the second time interval.

44. (New) The method of claim 43,

wherein each of the plurality of time intervals has a corresponding desired fractional pulse period based on:

a desired behavior of the motion control device over the plurality of time intervals; and

an actual behavior of the motion control device at the beginning of the time interval.

45. (New) The method of claim 41,

wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

using a delay to place each pulse at an arbitrary location within one of the time intervals.

46. (New) The method of claim 41,

wherein the time intervals are variable in length.

47. (New) The method of claim 41,

wherein the time intervals are fixed in length.

48. (New) The method of claim 47,

wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

changing a pulse period within one of the time intervals.

49. (New) The method of claim 41, wherein at least one of the time intervals has a single pulse, wherein the first pulse of the time interval is the last pulse of the time interval.

50. (New) The method of claim 41, wherein at least one of the plurality of time intervals has zero pulses.

51. (New) The method of claim 41, wherein the pulses have an average desired pulse period across the plurality of time intervals.

52. (New) The method of claim 41,

wherein the motion device comprises a stepper motor.

53. (New) The method of claim 41,

wherein the motion device is coupled to a motion control system, wherein the motion control system includes a processor and a memory medium, and wherein the memory medium stores a motion control software program.

54. (New) The method of claim 53,

wherein the motion control system comprises:

a computer system; and

a motion controller.

55. (New) The method of claim 53,

wherein a power drive is coupled to the motion device and the motion control system, and wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

56. (New) The method of claim 41, wherein at least one of the time intervals has a single pulse, wherein the first pulse of the time interval is the last pulse of the time interval.

57. (New) A carrier medium comprising program instructions for controlling motion of an object, wherein the program instructions are executable by a motion control system to implement:

determining a placement of one or more pulses for each of at least a subset of a plurality of time intervals, wherein two or more of the at least a subset of the plurality of time intervals have differing quantities of pulses, wherein each time interval that includes one or more pulses includes a first pulse and a last pulse, and wherein a deadband between the start of the last pulse in the time interval and the end of the time interval is no larger than a largest pulse period in the time interval; and

generating the pulses across the time intervals according to the determined placement to drive a motion device to move an object in a substantially smooth manner.

58. (New) The carrier medium of claim 57, wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

determining a placement of pulses for a first time interval according to a first pulse period, the first pulse period having an integer value corresponding to a desired fractional pulse period for the first time interval; and

determining a placement of pulses for a second time interval following the first time interval according to a second pulse period, the second pulse period having an integer value corresponding to a desired fractional pulse period for the second time interval.

59. (New) The method of claim 58,

wherein each of the plurality of time intervals has a corresponding desired fractional pulse period based on:

a desired behavior of the motion control device over the plurality of time intervals; and

an actual behavior of the motion control device at the beginning of the time interval.

60. (New) The carrier medium of claim 57,

wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

using a delay to place each pulse at an arbitrary location within one of the time intervals.

61. (New) The carrier medium of claim 57,

wherein the time intervals are variable in length.

62. (New) The carrier medium of claim 57,

wherein the time intervals are fixed in length.

63. (New) The carrier medium of claim 62,

wherein the determining the placement of one or more pulses for each of at least a subset of the plurality of time intervals further comprises:

changing a pulse period within one of the time intervals.

64. (New) The carrier medium of claim 57, wherein at least one of the time intervals has a single pulse, wherein the first pulse of the time interval is the last pulse of the time interval.

65. (New) The carrier medium of claim 57, wherein at least one of the plurality of time intervals has zero pulses.

66. (New) The carrier medium of claim 57, wherein the pulses have an average desired pulse period across the plurality of time intervals.

67. (New) The carrier medium of claim 57,

wherein the motion device comprises a stepper motor.

68. (New) The carrier medium of claim 57,

wherein the motion control system comprises:

a computer system; and

a motion controller.

69. (New) The carrier medium of claim 67,

wherein a power drive is coupled to the motion device and the motion control system, and wherein the power drive is operable to:

receive the pulses from the motion controller;

translate the pulses into power signals; and

send the power signals to the motion device.

70. (New) The carrier medium of claim 57, wherein at least one of the time intervals has a single pulse, wherein the first pulse of the time interval is the last pulse of the time interval.

71. (New) A system for controlling motion of an object, the system comprising:

a motion device which is operable to move the object;

a motion control system which is coupled to the motion device, wherein the motion control system includes a processor and a memory medium, wherein the memory medium stores a motion control software program, wherein the motion control software program is executable by the processor to:

determine a desired overall average step pulse period for a plurality of time intervals, wherein the desired overall average step pulse period is a non-integer number of

clock cycles;

determine a desired average step pulse period for each of the plurality of time intervals, wherein at least a subset of the desired average step pulse periods have a non-integer number of clock cycles;

for each interval of the plurality of intervals, perform one or more of:

determine one or more actual step pulse periods, each having an integer number of clock cycles; and

modify the interval;

wherein the one or more actual step pulse periods and/or the modified intervals for the plurality of intervals approximate the desired overall average step pulse period over the plurality of time intervals;

determine a placement of pulses for each of the plurality of time intervals based on one or more of:

the determined one or more actual step pulse intervals; and

the modified intervals; and

generate the pulses across the plurality of time intervals according to the determined placement to drive the motion device to move the object in a substantially smooth manner.

72. (New) A method for controlling motion of an object, the method comprising:

determining a desired overall average step pulse period for a plurality of time intervals, wherein the desired overall average step pulse period is a non-integer number of clock cycles;

determining a desired average step pulse period for each of the plurality of time intervals, wherein at least a subset of the desired average step pulse periods have a non-integer number of clock cycles;

for each interval of the plurality of intervals, perform one or more of:

determining one or more actual step pulse periods, each having an integer number of clock cycles; and

modifying the interval;

wherein the one or more actual step pulse periods and/or the modified intervals for the plurality of intervals approximate the desired overall average step pulse period over the plurality of time intervals;

determining a placement of pulses for each of the plurality of time intervals based on one or more of:

the determined one or more actual step pulse intervals; and

the modified intervals; and

generating the pulses across the plurality of time intervals according to the determined placement to drive a motion device to move the object in a substantially smooth manner.

73. (New) A carrier medium comprising program instructions for controlling motion of an object, wherein the program instructions are executable by a motion control system to implement:

determining a desired overall average step pulse period for a plurality of time intervals, wherein the desired overall average step pulse period is a non-integer number of clock cycles;

determining a desired average step pulse period for each of the plurality of time intervals, wherein at least a subset of the desired average step pulse periods have a non-integer number of clock cycles;

for each interval of the plurality of intervals, perform one or more of:

determining one or more actual step pulse periods, each having an integer number of clock cycles; and

modifying the interval;

wherein the one or more actual step pulse periods and/or the modified intervals for the plurality of intervals approximate the desired overall average step pulse period over the plurality of time intervals;

determining a placement of pulses for each of the plurality of time intervals based on one or more of:

the determined one or more actual step pulse intervals; and

the modified intervals; and

generating the pulses across the plurality of time intervals according to the determined placement to drive a motion device to move the object in a substantially smooth manner.